October 1977
No. 77-12
Health
Services
Administration

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# PSRO:
# An Evaluation of the Professional Standards Review Organization

## VOLUME 11:
## A COST-BENEFIT CONTEXT FOR PSRO UTILIZATION CONTROL ACTIVITIES

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Health Services Administration • Office of Planning, Evaluation, and Legislation

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# PSRO: AN EVALUATION OF THE PROFESSIONAL STANDARDS REVIEW PROGRAM

## VOLUME XI

# A COST-BENEFIT CONTEXT FOR PSRO UTILIZATION CONTROL ACTIVITIES

December 1977

Report Number: OPEL 77-12

Office of Planning, Evaluation and Legislation
Health Services Administration

By: Peter McMenamin, Ph.D.
University of North Carolina

Project Officers for the Government:

Bruce J. Steinhardt, HSA/OPEL
Allen Dobson, HSA/OPEL

Contract Number: HSA-77-123

Contract Cost to DHEW: $7,000.00

# PREFACE

This volume is a part of the evaluation of the Professional Standards Review Organization (PSRO) program as conducted during fiscal year 1976 and 1977 by the Office of Planning, Evaluation and Legislation (OPEL) of the Health Services Administration, U.S. Public Health Service, Department of Health, Education, and Welfare. The emphases of the evaluation were (1) utilization control, quality assurance, and cost-containment impacts and (2) program costs. The evaluation was conducted at a time when the PSRO program was in an early stage of implementation. It indicates what impact the PSRO program had achieved by the start of 1977, provides baseline data for future evaluative work, and offers pilot tests of numerous quality assurance and utilization control evaluation methodologies. Summarized below are the evaluation's major findings.

One major empirical study conducted was an analysis of Medicare utilization data compiled expressly for this evaluation by the Social Security Administration. The Medicare analysis investigated the effects of the PSRO program on hospital days of care per 1,000 enrollees, hospital admissions per 1,000 enrollees and average length of stay. Eighteen active PSRO areas were compared to twenty-six matched nonactive PSRO areas. No aggregate PSRO effect was found on the utilization variables studied. This finding implies that as a "treatment" the PSRO program thus far has not differentially affected Medicare utilization, when compared to other forms of utilization review being conducted in non-PSRO areas. While no overall relative utilization decrease was found, individual experiences varied. Some of the organizations were associated with lower (favorable) utilization while others reflected higher (unfavorable) utilization relative to their matched comparison areas. Generalizations from this data to the future program which will cover the entire U.S. would be tenuous, due to the unavailability of a proper random sample of the total 203 designated PSRO areas.

An analysis of hospital discharge abstract data, primarily derived from the Commission on Professional and Hospital Activities'(CPHA) Professional Activity Study (PAS) system found a very small relative decrease of less than 0.1 day in overall case mix-adjusted length of stay for Federal patients in PSRO hospitals using this abstracting service. When the patient records were sorted by payment sources, there were small, but statistically significant, findings with respect to Medicare and Medicaid average length of stay. Smaller (unfavorable) decreases in case mix-adjusted length of stay were found for Medicaid patients in hospitals under PSRO review than in non-PSRO comparison hospitals. In contrast, greater (favorable) decreases in ALOS were found for Medicare patients. It was also found that, in some instances, the proportion of longer stays in PSRO hospitals experienced a relative decline. The analysis also indicates greater reductions in average length of stay in PSRO areas with higher supplies of long-term care beds.

In contrast to the utilization findings presented above the effectiveness of the PSRO program as a quality assurance mechanism was less directly

measurable. The hospital discharge abstract data did indicate, however, that PSRO review tends to be associated with increases in case mix severity for Medicaid patients, but not for Medicare patients. This severity finding, while tentative because of methodological reasons, does suggest that PSROs may be utilizing bed days more efficiently.

Quality-oriented components of the PSRO program are just now being implemented. A study of a sample of medical care evaluation studies (MCEs) indicates that these studies have been effective in identifying and correcting problems of medical care in hospitals. The number of initial audits reported has grown to over a thousand per quarter, but the number of reaudits reported is small.

Profile analyses are implemented in only a few PSROs.

With respect to program costs, several policy options were considered, all computed in 1976 dollars. Targeted review[1] is the policy option currently (1978) in force in the PSRO program. The cost of targeted review, assuming review of 20% of all Federal patient hospital stays for 1976, was estimated at $184 million. [2] In contrast, a fully implemented acute care PSRO program to review 100% of Federal patient hospital stays would have cost approximately $268.5 million in 1976. The associated Federal discharge unit costs, including costs attributed to donated physician time, are calculated at $18.31 for delegated PSRO review and $16.00 for nondelegated PSRO review. [3]

The PSRO program is more expensive than its utilization review predecessors. The cost of nationwide implementation of the original utilization review (UR) regulations was estimated at $81.3 million for 1976, while nationwide implementation of the 1974 revised draft UR regulations in 1976 would have cost about $107.6 million.

In order to "recover" its costs, a 100% concurrent review PSRO program would have to reduce utilization rates of covered populations by 1.6 to 2.05 percent. For a 20% targeted review program, corresponding figures would be 1.1 to 1.4%. Study findings imply that, even though a few PSROs have demonstrated this degree of cost-effectiveness, the PSRO program is not now cost-effective and thus is not yet serving as a cost-containment mechanism.

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[1] i.e., review of less than 100% of discharges.

[2] The 20 percent figure was an arbitrary choice for purposes of illustratio and does not necessarily reflect an appropriate level of targeted review for the PSRO program.

[3] These figures are not strictly comparable in that nondelegated review includes only concurrent review, MCE, and abstracting costs, while delegated review also includes the costs of hospital UR committees and those hospital general administration costs which are allocatable to PSRO review.

The report cautions the reader against reaching final conclusions about the program since the evaluation was conducted during the time the program was in the developmental stage. However, the data suggest that PSRO implementation alone, without other changes to the health care system, is not apt to cause significant changes in either hospital utilization rates or associated governmental expenditures. The potential of the PSRO program to effectively assure the appropriateness and quality of care rendered in hospitals could not be adequately assessed within the time-frame of this evaluation. Therefore, more study is urged in several important areas as program development and implementation is continued. Many issues have been identified in the course of the evaluation which should be of value in deciding on the direction of future work.

# PSRO EVALUATION REPORT VOLUME STRUCTURE

Volume 1 : Executive Summary

Volume 2 : A Context for PSRO Evaluation: The Program and Evaluation Precedents

Volume 3 : Acute Care Utilization Review Impact: Some Data on the Medicare Experience

Volume 4 : Acute Care Utilization Review Impact: Inferences from a Sample of Hospital Abstract Data

Volume 5 : A Comprehensive Case Study: The Colorado PSRO Experience

Volume 6 : Case Studies of PSROs: A Contextual Analysis

Volume 7 : PSRO Quality Impacts: Inferences from the Medical Care Evaluations

Volume 8 : The Costs of Utilization Review Programs in Hospitals and in PSROs

Volume 9 : Acute Care Utilization Review Costs Associated with the Medicare/Medicaid Programs

Volume 10: Acute Care Utilization Review Costs: Synthesis of Components and Estimates for a Fully-Implemented Program

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# The Expenditure Impact of Utilization Control Through PSRO

## 1. INTRODUCTION AND SUMMARY

### 1.1. Objectives of the Study

It is often asserted that the PSRO Program has two goals: quality assurance and cost containment. Beliefs are many and varied about which of those two goals has the higher priority, but there is some consensus that the Program may have some impacts in both of these areas.

Curiously, although much of the focus on (and expectations for) the Program have been associated with cost containment, most of the attention on explicating potential program impacts has been in the area of quality assurance. Cost containment is supposed to be achieved by PSRO through utilization control with respect to services that are uneconomical or not medically necessary. Whether the utilization control parts of the Program, in fact, could achieve cost moderation -- much less, cost containment -- has rarely been an explicit consideration.

The major objective of this study is exactly that; to focus in on the expenditure impacts of PSRO utilization control. A methodology will be developed for valuing the potential benefits of utilization control, and a variety of estimates will be presented to provide a preliminary assessment of the potential role of PSRO with respect to its influence on expenditures for Medicare beneficiaries.

### 1.2. Major Findings

The major findings of the study seem quite paradoxical. On the one hand it can be shown that the utilization reductions (in hospital days of care per 1,000 enrollees) needed for PSROs to "break-even" -- and hence to contribute to cost moderation -- are quite small. (A PSRO will be described as breaking even if the estimated reductions in Medicare Part A expenditures due to utilization reductions just equal the estimated incremental expenditures for shifting from utilization to PSRO concurrent review of Medicare beneficiaries.) Even using the low estimates of the value of a day saved, the PSROs in the sample could "break-even" with a uniform aggregate reduction in utilization of only 2.05 percent. The maximum reduction that any single PSRO would have to achieve was less than 5 percent. Hence the prospect of PSRO contributions to cost moderation seem good.

On the other hand, even if effective, PSROs cannot be expected to add much to cost containment initiatives. The incremental cost of changing from UR to PSRO amounts to less than one percent of all Medicare expenditures. If all the PSROs in the sample had benefit-cost ratios of two-to-one, their impact would be a net reduction of expenditures of only 0.98 percent. Even if the full costs of PSRO are considered, the story is unchanged since total PSRO costs represent only 1.33 percent of Medicare hospital expenditures. Achievement of full cost containment through PSRO review would have required benefit-cost ratios the order of 16:1 in 1976.

Again, paradoxically, even though only small reductions were necessary to "break-even", few of the PSROs in the sample achieved any utilization reductions relative to matched comparisons. Further, there appeared to be no correlation between relative utilization reductions and PSRO budget data, utilization data, or prior review experience. A significant negative correlation was found between the percent relative utilization reduction and per diem reimbursement, however, a more sophisticated analysis would be required to pursue this result.

## 1.3. Organization of the Report

The background to this study begins with an examination of cost containment as a PSRO objective in the context of a discussion of the broad scope of PSRO activities and potential benefits. The specific methodologies to be employed in assessing the potential expenditure impacts of utilization control through PSRO and the attendent caveats constitute the remainder of Chapter 2. The data sources for this volume's analyses are derived from studies detailed in Volumes 3, 8, and 10. Discussion of these sources in Chapter 3 will be limited to any special details on the subsets of data made available for this analysis. In addition, a supplementary set of hospital charges and utilization data made available from the Health Care Financing Administration (HCFA) will also be described.

Specific estimation methods will be explained in the methodology chapter (still subject to all of the caveats of the background section).

Following this preparation, the range of program impact estimates will be presented in Chapter 5. Conclusions and speculations about areas for future inquiry will complete the text.

## 2. BACKGROUND

### 2.1. Cost Containment as an Objective

Although there was concern over allegedly poor quality care being provided under Medicare and Medicaid, major impetus to the passage of the PSRO Program was a rapid rise in Federal expenditures for health care during the late sixties. The legislative history of the PSRO Program is replete with allusions to those rising costs, including references by Senator Wallace Bennett to "skyrocketing" costs and "precipitous" rates of increase. Senator Bennett noted that, "...without effective professional controls on utilization the costs of the program will continue to soar."[1]

Although the wording of the legislation is somewhat more circumspect, those words can be inferred as a concern with cost control. The Declaration of Purpose for the program refers to providing only those services which are medically necessary, and it suggests that some services otherwise provided on an inpatient basis might be provided more economically on an outpatient basis. Other things being equal, elimination of services not medically necessary and substitution of relatively inexpensive services for those relatively more expensive would lead to lower health care expenditures.

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[1] U.S., Congress, Senate, Senator Bennett speaking for the Social Security Act Amendments of 1972, H.R. 1, 92nd Cong., 2nd sess., 27 September 1972, Congressional Record, 118:S16111-S16112.

Clearly, if health care program expenditures can be reduced by an amount greater than the expenditures for utilization control, there will be a net reduction in health expenditures, other things being equal. The problem is that other things are not being equal, viz., there are a variety of other forces driving up health care expenditures. For example, demand for health care is increasing due to increases in third party insurance coverage, increases in per capita income, increased availability of health resources, and the increasing age of our population, among other reasons. Hospital expenses have also risen as the sophistication of available technologies has increased and as the wages (and number) of hospital personnel have increased. As a result, cost moderation through utilization control might not be sufficient to achieve cost containment. (Throughout the volume, cost moderation will be used to refer to decreases in the rate of increase of hospital expenditures. For our purposes, cost containment will be achieved only when there are no increases in hospital expenditures.)

## 2.2. PSRO and Utilization Control

As noted above, the PSRO Program was created in response to several problem areas in Medicare and Medicaid. Rising cost was only one concern. As a result, although the PSRO Program does have elements related to utilization control, they are by no means the only elements to the program. Therefore, utilization control will not be the only potential benefit of the PSRO Program.

For example, through Medical Care Evaluation Studies, the PSRO Program is expected to have a direct impact on health care quality. In addition, even that part of the program most related to utilization control -- concurrent review -- seems to have a quality impact through inducing improved medical record-keeping. There are also a variety of more or less intangible benefits to the PSRO Program, such as institution building for a future National Health Insurance Scheme.

Although these other aspects and benefits of the PSRO Program cannot be denied, they are in some sense peripheral to the question of potential PSRO cost containment impact. For this reason, this study will proceed by trying to isolate only those costs and benefits related to utilization control. By using this admittedly narrow focus, one can assess the range of utilization control benefits necessary for that part of the program to "break-even." Any benefits in excess of that level will contribute to moderation of expenditure increases. Only at that point will it be possible to assess the program's potential for true cost containment.

### 2.3. Estimating the Economic Value of Changes Induced Through Utilization Control

The benefits for the purpose of this volume are reductions in utilization and the inferred reductions in program expenditures. The latter apply solely to Medicare Part A expenditures and these estimates

involve short-run direct expenditure reductions exclusive of case-mix changes, alternative sources of care, or other factors that might also lead to expenditure reductions. With regard to utilization reductions, the study will produce a range of "break-even" estimates. These will be expressed in terms of 1) days of care for individual PSRO areas; and 2) days of care in acute care institutions per 1,000 eligibles.

### 2.3.1. The Value of Days Saved

The "break-even" analysis will begin with estimates of the costs of PSRO utilization control. Cost moderation would require benefits at least that great. The translation from dollar benefits to "necessary" utilization reductions then requires a method for assessing the value of days saved.

Although the most convenient figure to use in this process would be the average cost of a hospital day, this would ignore the fact that the composition of services provided during hospitalization changes markedly from the beginning of the stay to its conclusion. Specifically, the early part of a stay is service intensive; the tail-end emphasizes "hotel" service. In fact, concurrent review is expected to expedite patient management in just these cases where intensive medical service is no longer warranted. Hence, to the extent that days are saved their value will be less than that of the average day.

The relationship between fixed and variable costs also complicates the calculations to the extent that fixed costs cannot be reduced in the very short run. The most commonly cited figure for variable costs is 40% of the average -- based on an analysis of fixed and variable costs in hospitals assembled for the Cost of Living Council. (This was a best consensus estimate, derived from a literature survey of econometric models of hospital cost and production functions.) For the purpose of this study volume a slightly different approach will be used to take advantage of individual hospital cost data, however, our estimates are expected to yield very similar results.

This estimation will proceed on the basis of a hypothetical experiment. It presumes that nothing in a hospital's operations or expenses changes over the course of a year, but that one Federal (Medicare) patient's stay is shortened by one day. The impact of such a change would work its way through the end of year adjustments in reimbursements conducted by Medicare. The change in an individual hospital's total reimbursement due to the change in utilization can be computed using an algorithm which will be detailed in Chapter 4. (Utilization reductions might derive from reductions in admission rates, and it might be argued that the value of such savings would be greater than the savings obtained through length of stay reductions. Medicare reimbursements for routine expenses, however, treats these reductions as identical, hence no distinction will be made for the source of utilization reductions.)

This value for a day saved in particular hospitals will then be aggregated to estimate, by PSRO area, the value of a day saved. The aggregation will be based upon weighting individual hospital values by the proportion of total Medicare volume in each hospital.

The premise of the analysis is that all other things remain equal. The result is an estimate of the short-run or "first round" impact of program-induced utilization changes. Clearly, to the extent that there is a significant utilization impact, there will be second and third round changes. These may come in terms of capital budgeting or staffing. They may influence rate determinations in future years or negotiations under prospective reimbursement. While plausible, however, second and third round changes will be considered as yielding only fourth or fifth order effects in the short-run. In the interpretation of the findings, those possible effects which are most cogent will be discussed in terms of the direction of impact, but they will not be explicitly included in the analysis.

### 2.3.2. Substitution Effects

Reductions in acute care utilization will not occur in isolation. In fact, a variety of substitution effects are expected. Patients whose lengths of stay are shortened may, in fact, spend more time in a long-term care facility than they would have otherwise. Similarly, a patient who is not admitted to a hospital for a diagnostic work-up

may have the same diagnostic testing performed on an ambulatory basis. There may also be substitutions within the hospital, perhaps even in excess of the increase in average service intensity that might be expected given shortened hospital stays.

To the extent that reductions in inpatient acute care are offset by increases in long-term care or ambulatory care, the estimates of the value of days saved will be biased upward. Unfortunately, the biases in those estimates due to substitutions with respect to ancillaries are not unequivocal. For example, substitutions in terms of increased non-medical ambulatory care might just offset changes in ancillary usage due to stays which are shortened or deterred. Alternatively, there might be a reduction in ancillaries concomitant with shortened stays (which would be a function of the elasticity of provision of ancillary services at the point of a change in the length of stay). On the other hand, as a result of the impact of PSRO criteria and standards there might be a net increase in ancillary usage in spite of any length of stay decreases due to utilization control. For these reasons, a variety of estimates of ancillary service changes will be used to adjust the estimates of the value of days saved.

### 2.4. Spillovers

While Social Security Act health programs contribute less than half of the Nation's days of care or admissions, non-federal patients will

not be unaffected by PSRO operations. However, although identification of potential spillover impacts is possible, at the present time estimation of the value of those impacts is not possible. This discussion therefore, will be limited to an enumeration of potentially significant spillovers and their plausible directions of impact.

### 2.4.1. As if Hospital Performance Were Unchanged

In one specific area, the analysis is based on an assumption that there is no spillover. For computational simplicity, the algorithm used to compute the value of a day saved assumes that only Federal days of care change as a result of concurrent review (with a resulting increase in unit Medicare expenditures). If hospital staffs responded by increasing non-federal utilization, Medicare savings would be greater, however, non-federal health expenditures would also increase. In the absence of empirical evidence about such reactions by hospitals or their staffs, one can only speculate about such effects. Speculation, however, was insufficient for specification of an estimating algorithm, hence this particular spillover was set as zero.

### 2.4.2. Other Spillovers

Program spillovers to non-federal patients involve much the same benefits and costs. To the extent that acute care hospitals improve in quality or rationality these benefits certainly will accrue to non-federal patients. Further, to the extent that concurrent review has an educational impact that improves provider performance, this benefit will also accrue to those patients.

For the purpose of estimating short-run impact, non-federal utilization was assumed to be unchanged. However, it is possible that such utilization may decline along with that of Federal beneficiaries. This might lead to savings in individual cases.

On the other hand, if Federal utilization declines, unit prices for hospitals will increase unless increases in non-federal utilization offset the decline. (Current cost reimbursement methods guarantee a rise in unit prices with a declining utilization base.) Hence, if non-federal utilization is constant or declines, unit hospital prices for all beneficiaries will appear to increase as a spillover from utilization control effectiveness.

With respect to cost control, the change in unit prices for Federal beneficiaries is included in the algorithm for estimating the value of days saved. The "net" spillover with respect to cost containment for the non-federal population, however, cannot be estimated at this time. Hence it will not be explicitly included in the analysis.

## 2.5. Costs of PSRO Concurrent Review

### 2.5.1. Opportunity Costs

The cost of PSRO utilization control efforts is not merely the sum of the direct expenditures for concurrent review. The dollars which are spent on review have opportunity costs in that they might have had alternative uses (e.g., increased health benefits coverage; more

effective forms of review). Were a consensus figure available on the rate of return to Federal programs one could use it to adjust program expenditures to estimate the true opportunity costs. In the absence of such a figure one notes that the cost estimates are biased downward, hence the "break-even" projections for utilization changes will also be biased downwards.

### 2.5.2. Cost Estimations

Gross estimates of PSRO costs by PSRO area were obtained from the studies of Volumes 8 and 10. These were available in the form of separate figures for PSRO administrative costs, delegated review costs, and non-delegated review costs. (These included medical care evaluation (MCE) costs since MCE studies are expected to affect physician directed hospital utilization and, in some cases, these studies are specifically directed at administrative problems such as transmission lags in lab reports or x-rays.) The estimates were based on PSRO implementation in individual PSRO areas as of 1976.

A sample of cost statistics available from a subset of PSROs was also made available to estimate the relation between operating costs for concurrent review and PSRO start-up costs. The statistics derive from a series of site visits to nine of the eighteen PSROs which were studied for changes in utilization rates (see also Vol. 3).

### 2.5.3. Medicare Only

Consistent data on utilization changes for Social Security Act beneficiaries were available for Medicare only. The cost data, however, were generated using information from operating PSROs which handle Medicare, Medicaid, Title V, and even non-federal patients. What is needed is an estimate of the costs of concurrent review as if it were applied to Medicare only. Such an estimate will be generated by using as weights Medicare admissions as a proportion of all Federal admissions. One might argue that this underweights Medicare in terms of continued stay review, because Medicare represents a smaller percentage of Federal admissions than of Federal days of care. Evidence from the site visits, however, suggests that continued stay review bench marks are based on median lengths of stay, hence any downward bias in the cost estimates is expected to be small.

### 2.5.4. Economies of Scale

In fact, if a utilization control program existed only for Medicare, its unit costs probably would be higher than currently observed because relatively fixed costs would be spread over a smaller patient volume. Indeed, there are two other sources of economies of scale that might yield lower unit costs in the future. The first of these is attainment of 100% of review. Although all of the PSROs included in the analysis were reviewing at least 50% of Federal patients, they ranged

from 100% down to 61% review. (Two thirds of the PSROs in the sample were reviewing in excess of ninety percent of Federal admissions.) Given economies of scale, if increases in the review percentage yield proportional increases in impact, there would be a greater potential for cost moderation than is currently observed. Similarly, should PSRO review be expanded to include all patients--without lessening program effects--both unit costs and total Federal costs might be reduced, again increasing the potential for cost control. Cross-section observations which confirm potential scale economies will be noted; however, at this time the magnitude of such effects remains speculative. Hence, the possibility will not be explicitly included in the analysis. Economies might also occur if review is focused on those most likely to benefit from review. However, since none of the PSROs studied for utilization impact used focused review, the subject will remain speculative until empirical evidence is available.

### 2.5.5. Start-up Costs

The initial investment in PSRO start-up costs cannot be assumed to generate sufficient benefits in the first year to contribute to expenditure moderation. On the other hand, these costs do constitute program expenditures and those expenditures should be amortized over the first years of the program. Start-up costs will be estimated for each PSRO area using the relationship between start-up costs and operating costs identified in the subsample cited under 2.5.2. These costs will be assumed to be amortized over a ten year period using a straight line write-off and an eight percent interest rate.

### 2.5.6. Inflation in the Health Sector

Although inflation in health sector prices contributes to the growth of Medicare and Medicaid expenditures, PSROs can be expected to have no direct impact on prices. To the extent that this inflation persists, however, the PSROs will be in the paradoxical position of being more likely to reach the "break-even" point. All that would be required is that unit concurrent review costs rise by a smaller amount than hospital costs. Since the range of published estimates of the costs of review has not nearly experienced the increases observed for hospital prices, one suspects that PSROs will need to produce smaller reductions in utilization to cover their costs in the future. On the other hand, if effective price control is applied to hospitals, it is somewhat more likely to control hospital prices than health sector wages. In that case, (labor intensive) concurrent review would increase in cost at a time when the dollar value of reductions in utilization are stable or rising more slowly.

## 3. DATA SOURCES, QUALITY AND VALIDITY

As noted above, the estimates for PSRO costs are derived from the analyses of Volume 8 and 10. Special PSRO specific cost estimates were made available for use in this volume. Also previously noted were estimates of start-up costs derived from site visits to nine of the eighteen PSROs.

Estimates of PSRO utilization impact were made available from the analyses of Volume 3. These consisted of projections of expected PSRO utilization rates based on data from 18 active and 26 non-active matched PSRO areas. Those expected rates were compared to observed rates to assess PSRO impact.

The observed rates of utilization (total days of care per 1,000 aged Medicare Part A enrollees) were among a host of data elements made available from the Health Care Financing Administration. In addition, HCFA provided information, by hospital, on audited average daily routine and ancillary reimbursements for Medicare for most of the hospitals in the eighteen areas for 1974 and 1975. These data were used to estimate Medicare "inflation" rates for hospitals which were in turn used to inflate the reimbursement figures for other hospitals in the same PSRO area with 1974 data only. Medicare days of care by hospital were also provided for use in the algorithm for estimating the value of a day saved. Finally, HCFA also provided data, by PSRO area, on eligibles, admissions, discharges, and days of care for 1976.

The figure used to inflate 1975 reimbursements to 1976 dollars was based on changes in the hospital component of the Consumer Price Index. Data on total utilization (days of care) per non-federal short stay hospital were obtained from files of the 1975 Master Facility Inventory.[1] Both of these sets of data were also used in computing the value of a day saved.

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[1] National Center for Health Statistics, Health Resources Administration, DHEW.

## 4. METHODOLOGIES TO BE EMPLOYED

### 4.1. Value of a Day Saved

The basis for the algorithm for computing the value of a day saved is a hypothetical experiment. One assumes that in a particular hospital one Medicare patient's stay is shortened by one day. One can then assess the impact of the change on hospital reimbursement.

Medicare reimbursements to hospitals are available in several forms. For example, Periodic Interim Payments (PIP) are lump sum payments based upon estimates of utilization and hospital expenditures. Two other forms of interim payments, however, appear to be more closely related to specific hospital episodes. Under one of these forms a hospital receives an interim reimbursement based upon a pre-established per diem and the actual length of stay. Under the other, interim reimbursement is based upon a pre-established percentage of the hospital's charges for the particular episode. In fact, these interim payments are only indirectly related to the actual amount of reimbursement that a hospital could attribute to a specific episode. The reason for this is that an end of year audit of allowable expenditures is performed for Medicare by the fiscal intermediary. At that time, these expenditures are allocated between Medicare and other patients. (The allocation formula is described below.) It is at that point that adjustments will be made if the interim payments have been too high or too low. The data on Medicare reimbursements used for this analysis are the charges per day determined by the year end audit.

For the purpose of the analysis one must make some simplifying assumptions. These are:

1) All hospital expenditures are fixed. This is a somewhat conservative assumption; however, the expected changes in utilization are not substantial. Further, it is much more likely that hospital input factors will merely be diverted from "under-used" activities to other activities rather than be released. (To the extent that there are absolute reductions in hospital expenditures as a result of utilization reductions, this assumption will bias downward the estimates of the value of days saved.)

2) An initial assumption will be that any change in the usage of ancillary services due to changes in days of care will exactly be offset by ancillary usage in ambulatory or long-term care settings. An alternative assumption will be used to provide a range of estimates; *viz.*, a net decrease of fifty percent of daily ancillary reimbursement per day saved. An argument can be made that a net *increase* of fifty percent of daily ancillary reimbursement would also be plausible in identifying the range of possible values of a day saved. (Due to an approximately five percent increase in daily ancillary usage in compliance with PSRO criteria and standards.) However, because of missing data from generally larger -- more costly -- hospitals it was believed that there was a downward bias to the estimated per diems. Hence, only the totally fixed cost estimate and the ancillary reduction estimate will be used to provide a range of impacts.

3) Non-federal patients' hospital charges and days of care remain unchanged. As noted above, this will overlook the impact of any responses by hospital staffs such as an increase in non-federal utilization to maintain occupancy levels. Analysis of the bias created by this assumption is straightforward. To the extent that non-federal utilization increases, the estimates of the value of days saved will be biased downward. If non-federal utilization also declines these values will be biased upward.

The algorithm focuses on the impact of changes in Medicare utilization on end of year reimbursements (expenditures). The end of year reimbursement analysis conducted for Medicare is roughly as follows:

$$R_i = \frac{M_i}{M_i + N_i} * TRC_i + \frac{MC_i}{MC_i + NC_i} * TAC_i$$

where $R_i$ = annual reimbursement to hospital i

$M_i$ = annual Medicare days of care in hospital i

$N_i$ = annual non-Medicare days of care in hospital i

$TRC_i$ = annual routine services expenditures in hospital i

$MC_i$ = annual Medicare ancillary service charges in hospital i

$NC_i$ = annual non-Medicare ancillary service charges in hospital 1

$TAC_i$ = annual ancillary services expenditures in hospital i

Mathematically, the initial assumptions are as follows:

$$\frac{dN}{dM} = \frac{dTRC}{dM} = \frac{dMC}{dM} = \frac{dNC}{dM} = \frac{dTAC}{dM} = 0$$

Differentiating R with respect to M yields

$$\frac{dR_i}{dM_i} = \frac{(M_i+N_i) - M_i}{(M_i+N_i)^2} \cdot TRC_i = \frac{N_i}{(M_i+N_i)^2} * TRC_i$$

One defines two additional variables, the average daily routine expenditures (ADRC) and the Medicare percentage of total hospital days (MPD).

$$ADRC_i = \frac{TRC_i}{M_i+N_i}$$

$$MPD_i = \frac{M_i}{M_i+N_i}$$

This allows

$$\frac{dR_i}{dM_i} = (1-MPD_i) * ADRC_i$$

which is the value of the one day saved from the hypothetical experiment. That is, it would be equal to the reduction in Medicare's total reimbursement to that hospital due to the utilization reduction. (One should note, given the allocation formula and the assumption of fixed expenditures, that utilization reductions due to shortened lengths of stay will have the same impact on reimbursements as utilization reductions due to reductions in admissions.)

Given some number (H) of hospitals in a PSRO area one assumes that the probability that a day of care is saved in any one of them should be equal to the relative frequency with which days of care are provided in that hospital. (Although this is a somewhat arbitrary assumption, there is no other non-arbitrary a priori assumption that would allow specification of an estimating algorithm). These probabilities, to be used as weights, are of the

form

$$W_i = \frac{M_i}{\sum_{i=1}^{H} M_i} .$$

These weights will be computed using Health Care Financing Administration data, by hospital, on Medicare days of care in 1975.

Given these weights, one estimates the value of a day saved in a specific PSRO area as

$$V_{PSRO} = \sum_{i=1}^{H} W_i*(1-MPD_i)*ADRC_i$$

Data from the Master Facility Inventory coupled with the HCFA data on Medicare days will allow computation of $MPD_i$. HCFA has also provided data on audited per diem routine services expenditures (ADRC) for individual hospitals in 1975 which will be inflated uniformly using the hospital service component of the CPI to obtain 1976 values.

The estimate of the value of a day saved is based on a linear model of small changes. If there were to be nonnegligible changes in utilization the estimated changes in reimbursements would underestimate the "true" changes. That is, the value of days saved is biased downward, hence the estimates of required utilization changes may be biased upward.

## 4.2 Concurrent Review Costs for Medicare Only

Annual estimates for total concurrent review expenditures (TCRE) will be converted to Medicare concurrent review expenditures as follows:

$$MCRE = \frac{M}{M+D} * TCRE$$

where M = Medicare admissions in a PSRO area

D = Medicaid admissions in a PSRO area

## 4.3 Start-up Costs

Data from nine of the eighteen sites are available on start-up costs and operating costs for the initial three years of operation. The total of these non-deflated initial start-up costs per PSRO will be assumed to be the total start-up costs for concurrent review. The relation between these costs and third year operating costs will be examined to identify the relation for a "typical" PSRO. (Because of confidentiality agreements, none of the nine PSROs could be identified for this analysis.) This "typical" relation will be used to estimate start-up costs for each of the PSRO areas on the assumption that the relation between start-up costs and 1976 operating costs was uniform across the PSRO areas. Because these estimated costs will be assumed to be amortized over a ten year period any errors introduced by the uniformity assumption are expected to be small.

These start-up costs are assumed to be amortized over a period of ten years using a straight line write-off and an interest rate of eight percent. Using this approach, and assuming that interest is paid on the declining balance of the principal, each annual payment will amount to 14 percent of the initial principal. Hence 14 percent of the estimated start-up costs will be added to the operating costs of each PSRO in computing the 1976 costs for each PSRO.

### 4.4 Incremental Costs of PSRO Acute Hospital Review

The expenditures for PSRO do not exist in isolation. In the absence of the program Medicare dollars would be expended for the predecessor program, Utilization Review (UR). The costs of the UR program, were that program in effect in the eighteen PSRO areas, were estimated by using the estimated delegated and non-delegated review costs and 1976 UR (revised UR) costs.

The PSRO administrative costs were deemed solely due to the PSRO program. However, because PSRO review in hospitals requires tasks not previously required under UR, only some fraction of delegated and non-delegated review costs would be required to support UR in those hospitals. OPEL statistics indicated that the ratio of PSRO delegated review costs to UR costs was .698. For non-delegated review, this ratio was .734.

Following this, delegated and non-delegated PSRO review costs for 1976 were deflated to estimate what expenditures for utilization review would have been in 1976. The difference between estimated PSRO costs and estimated UR costs represents the incremental cost of PSRO review. Because the estimates of PSRO impact in active areas were based on an implicit comparison to PSRO areas which had UR only, the comparison of needed benefits to costs should be based primarily on incremental operating costs (plus start-up) only.

### 4.5 "Break-even" Benefits

On the assumption that PSRO utilization control has no impact on the number of eligibles in an area, one can compute "break-even" utilization

reductions per PSRO area and "break-even" reductions in utilization rates per eligible. These are, respectively:

$$B_j = \frac{M_j}{V_j}$$

$$\Delta U_j = \frac{B_j}{E_j}$$

where: $B_j$ = "break-even" utilization reduction in total days of care

$\Delta U_j$ = "break-even" utilization reduction in total days of care per eligible

$M_j$ = Medicare incremental expenditures for concurrent review plus amortized start-up costs

$V_j$ = value of a day saved

$E_j$ = number of Medicare eligibles

## 5. FINDINGS

The data used in these analyses derive from a sample of eighteen PSROs. Six were statewide PSROs, the remainder were substate jurisdictions. Four of the PSROs are located in states which had had statewide review systems for Medicaid prior to the establishment of the PSRO program. Four other PSROs had review experience in the Experimental Medical Care Review Organization (EMCRO) Program prior to designation as a PSRO. One of the PSROs is widely acknowledged to have been a PSRO prototype. The eighteen PSROs in the sample will be referred to as A, B, C,..., R. This ordering does not correspond to that used in other volumes and is neither alphabetical by state nor chronological by entry in the national program.

### 5.1 Costs of PSRO Review

Costs estimates were provided for each of the areas in terms of the various PSRO expenditures given the actual level of implementation in 1976. Implementation varied from review of one hundred percent of admissions, in several areas, to a low of about sixty two percent, in area E. These estimates were available in terms of the PSRO administrative expenditures and review expenditures in both delegated hospitals and non-delegated hospitals. As indicated in Chapter 4, these terms were combined to get a total concurrent review cost for each PSRO. Each total was adjusted using the Medicare proportion of admissions to determine a concurrent review expenditure estimate for Medicare only. (See Table 5.1.)

These same figures were used to estimate the expenditures that would have been incurred for utilization review in those areas in the absence of a PSRO. The differences between the estimated costs for PSRO and for UR are the estimates for the incremental cost due to PSRO. (Also see Table 5.1.)

The estimates of actual implementation costs provide little or no evidence of economies of scale with increases in patient volume. (See Table 5.2.) Most of the eighteen PSROs have annual Medicare patient loads which range from ten thousand to thirty five thousand. Within that range there appears to be a slight positive correlation between the number of admissions and the cost per admission. Three PSROs had annual Medicare patient loads of forty six-, seventy one-, and one hundred eight-thousand, respectively and these had per admission costs near or below the median. All three,

## Table 5.1

## Medicare Review Cost Estimates

| PSRO | Medicare % of Federal Admissions | PSRO Cost | UR Cost | Incremental Cost |
|---|---|---|---|---|
| A | 82 | $ 197,973.35 | $ 77,346.42 | $ 120,626.93 |
| B | 74 | 503,547.06 | 192,451.17 | 311,095.89 |
| C | 65 | 154,000.60 | 44,938.33 | 109,062.27 |
| D | 71 | 569,357.86 | 322,720.56 | 246,637.30 |
| E | 65 | 300,417.68 | 139,164.72 | 161,252.96 |
| F | 79 | 734,537.59 | 285,680.54 | 448,857.05 |
| G | 72 | 1,201,825.90 | 673,317.48 | 528,508.50 |
| H | 77 | 177,767.24 | 78,691.63 | 99,075.61 |
| I | 70 | 938,202.09 | 487,747.08 | 450,455.01 |
| J | 51 | 190,447.74 | 95,292.43 | 95,155.31 |
| K | 54 | 152,034.40 | 58,491.55 | 93,542.85 |
| L | 67 | 622,740.63 | 217,238.91 | 405,501.72 |
| M | 73 | 577,661.13 | 250,082.21 | 327,578.92 |
| N | 64 | 208,234.88 | 75,518.66 | 132,716.22 |
| O | 73 | 492,290.96 | 192,333.80 | 299,957.16 |
| P | 52 | 230,292.73 | 89,973.36 | 140,319.37 |
| Q | 61 | 229,663.49 | 121,665.28 | 107,665.28 |
| R | 50 | 737,702.75 | 316,224.46 | 421,478.29 |

## Table 5.2

### Medicare Review Costs Per Admission and Annual Admissions

| PSRO | 1976 Implementation Costs per Reviewed Admission | Medicare Volume | Percent Reviewed in 1976 |
|---|---|---|---|
| A | $16.19 | 12,221 | 99+ |
| B | 18.31 | 27,493 | 100 |
| C | 14.56 | 10,575 | 99+ |
| D | 13.58 | 46,517 | 90.1 |
| E | 34.76 | 13,959 | 61.9 |
| F | 23.11 | 31,781 | 99+ |
| G | 17.55 | 108,319 | 63.2 |
| H | 23.10 | 9,617 | 80.0 |
| I | 15.74 | 70,942 | 84.0 |
| J | 12.00 | 16,561 | 95.8 |
| K | 16.91 | 8,988 | 100 |
| L | 26.65 | 30,300 | 77.1 |
| M | 21.31 | 30,625 | 88.5 |
| N | 17.51 | 12,618 | 94.2 |
| O | 17.45 | 28,205 | 99+ |
| P | 18.89 | 12,188 | 100 |
| Q | 13.30 | 17,267 | 99+ |
| R | 22.36 | 32,987 | 99+ |

however, were located in relatively low wage areas. Hence there is virtually no support for possible economies of scale in these data.

Start-up costs were available for nine of the eighteen PSRO areas, however, for confidentiality reasons, those PSROs could not be identified to this investigator. Start-up costs for the first three years excluding such expenditures on long term care and/or ambulatory care were assumed to represent the full start-up costs for concurrent review. These were compared to operating costs in the third year as in Table 5.3.

Although the ratio of aggregate start-up costs to aggregate operating costs was .49, the largest PSRO also had the largest ratio, hence .49 was considered to be biased upward. However, because both the median and mode ratio were .45, this figure was chosen as the "typical" ratio of start-up costs to operating costs. As noted in Chapter 4, amortization of start-up costs was assumed to require an annual payment of fourteen percent of total start-up costs. Hence the estimated addition of PSRO start-up costs to incremental costs would be 6.3 percent of total operating costs. Incremental costs plus apportioned start-up costs are presented in Table 5.4. Also presented are the estimates of those costs per Medicare day of care in 1976. These range from a low of $0.52 per day for PSRO O to a high of $2.13 per day for PSRO L. The aggregate weighted average of these costs per day was $1.08.

## 5.2 Value of a Day Saved

The methodology for estimating the value of a day saved in a particular PSRO area was explained in Chapter 4. Data were provided from HCFA, by

Table 5.3

Ratios of Startup Costs to Operating Costs

| PSRO | 3 Year Startup Costs (thousands) | 3rd Year Operating Cost (thousands) | Ratio |
|---|---|---|---|
| 1 | $ 673.8 | $ 682.7 | 1.01 |
| 2 | 230.7 | 87.5 | .37 |
| 3 | 756.4 | 191.2 | .25 |
| 4 | 175.3 | 80.1 | .45 |
| 5 | 185.1 | 49.2 | .26 |
| 6 | 215.2 | 97.7 | .45 |
| 7 | 573.8 | 295.7 | .51 |
| 8 | 172.3 | 122.7 | .71 |
| 9 | 461.6 | 108.7 | .23 |
| total | $ 3444.2 | $ 1715.5 | .49 |

## Table 5.4

## Medicare Incremental Costs Plus Apportioned Startup for PSRO

| PSRO | Incremental Costs Plus Startup | Incremental Costs Plus Startup Per Patient Day |
|---|---|---|
| A | $ 133,099.25 | $ 1.23 |
| B | 342,819.35 | 1.30 |
| C | 118,764.40 | .90 |
| D | 282,506.84 | .53 |
| E | 180,179.27 | 1.65 |
| F | 495,132.91 | 1.89 |
| G | 604,223.53 | .88 |
| H | 110,274.94 | 1.21 |
| I | 509,561.74 | .81 |
| J | 107,153.51 | .52 |
| K | 103,121.01 | 1.07 |
| L | 444,734.37 | 2.13 |
| M | 363,971.57 | 1.20 |
| N | 145,835.01 | 1.40 |
| O | 330,971.49 | 1.44 |
| P | 154,827.81 | 1.63 |
| Q | 122,134.07 | .98 |
| R | 467,953.56 | .94 |
| weighted average | | $ 1.08 |

institution, on Medicare days of care, and average daily "routine" reimbursements and average daily ancillary reimbursements. Data were also provided from the Master Facility Inventory on total days of inpatient care for those institutions.

### 5.2.1 Missing Data Problems

Hospital reimbursement data (audited per diems for routine and ancillary services) were available for 1974 and 1975. Unfortunately, not all hospitals had data from both years, and many hospitals had no reimbursement data from either year. This might not be a significant problem if those hospitals without data were not significantly different than those with data. Unfortunately, there appeared to be a consistent bias in that hospitals without data tended to be those hospitals with relatively large patient volumes. Comparisons among hospitals with data suggested that higher reimbursements could be expected in the larger hospitals, hence reimbursement estimates from PSRO areas missing large hospital data might be biased downward.

Table 5.5 illustrates the extent of this problem. PSRO's B, O, M, and R are urban areas. Reimbursement data were available from hospitals in those areas representing only a relatively low percentage of the total Medicare days of care. Hospitals of above average volume without reimbursement data represented a significant amount of their patient volume. The disparity between the average volume of hospitals with reimbursement data and those without is readily apparent. PSROs C and E, also urban areas are each missing data from a single large hospital representing about one quarter of their total

## Table 5.5

## Missing Reimbursement Data

| PSRO | % of days in hospitals with data | # of above average volume* hospitals missing data | % of days in large volume* hospitals missing data | average Medicare volume* hospitals with data | average Medicare volume* hospitals missing data |
|---|---|---|---|---|---|
| A | 88 | 1 | 14 | 4554 | 1954 |
| B | 32 | 6 | 67 | 14851 | 27513 |
| C | 62 | 1 | 24 | 19381 | 19286 |
| D | 95 | 0 | 0 | 28233 | 7653 |
| E | 59 | 1 | 26 | 27887 | 25292 |
| F | 88 | 2 | 6 | 5369 | 1920 |
| G | 71 | 8 | 15 | 10517 | 6554 |
| H | 99 | 0 | 0 | 27695 | 70 |
| I | 71 | 7 | 24 | 10265 | 10690 |
| J | 61 | 2 | 38 | 17686 | 44936 |
| K | 100 | 0 | 0 | 15355 | 0 |
| L | 72 | 6 | 21 | 6469 | 4417 |
| M | 57 | 3 | 40 | 13606 | 30570 |
| N | 82 | 1 | 12 | 5910 | 6143 |
| O | 66 | 2 | 30 | 5459 | 6762 |
| P | 99 | 0 | 0 | 7413 | 305 |
| Q | 89 | 0 | 0 | 5767 | 2726 |
| R | 16 | 10 | 79 | 20574 | 28783 |

*patient days

patient days. The disparity between the average volume of hospitals with data and those without, however, is relatively small.

To the extent that missing reimbursement data derive from hospitals with above average reimbursement rates, the estimates of the value of a day saved will be biased downward. It is for this reason that only two sets of estimates are presented: the lower one based on all costs being fixed, the higher based on a possible reduction in ancillary expenditures given reductions in total days of care. Plausible and still lower estimate could be made on the assumption of a net increase in ancillary usage due to PSRO review. Given a downward bias in the data and in the estimating algorithm itself, this other estimate was not thought worth computing.

### 5.2.2 Changes in Reimbursements

Some hospitals only had one year's worth of data, 1974 or 1975. And no hospital had data for 1976, the year corresponding to the review cost data. In order to bring the 1975 data into correspondence with the 1976 cost data, these data were inflated uniformly by the percentage change in the hospital service component of the Consumer Price Index observed between fiscal 1975 and fiscal 1976, viz., 13.4 percent.

It was decided to rely on the available data from each area to estimate the changes in reimbursement rates in those areas between 1974 and 1975. The average of the "inflation" rates for routine and for ancillary reimbursement rates, weighted by Medicare days of care, was computed using all hospitals with data from both years. These were then applied to estimate 1975 reimbursement rates in those hospitals which had 1974 data only.

Again, there was a potential problem of missing data, since those hospitals with 1974 data only tended to be the larger of the hospitals. (See Table 5.6.) However, there was no discernible relation between hospital volume and percentage change in reimbursement rates for those hospitals reporting two years of data. The estimated "inflation" rates for each of the areas were also presented in Table 5.6.

In PSROs E, H, and K the inflation rate was negative for ancillaries. In each instance this was caused by a single "dominant" hospital in each area which had observed a reduction in its average daily ancillary reimbursement. In area A no hospital had any 1975 reimbursement data, so the percentage change in the hospital service component of the CPI was used as an estimator. Between fiscal 1974 and fiscal 1975, this statistic rose by 14.1 percent. Both sets of circumstances may also have imparted a small downward bias in the estimates since for ten of the areas either one or both of these "inflation" rates exceeded the national average represented by the CPI statistic.

### 5.2.3 Estimated Values

Estimated values are presented in Table 5.7. The estimated per diem reimbursement varies from a low of $80.58 in PSRO G, a rural area, to a high of $191.29 in PSRO N, an urban one. The low estimates of the value of a day saved range from $29.01 in PSRO G to $71.57 in PSRO R. When ancillary service changes are also included the estimates of the value of a day saved increases. These range from $43.23 in PSRO I to $94.84 in PSRO N.

The ratio of the low estimate to the average per diem should be unbiased, since both individual estimates are subject to the same biases. These

Table 5.6

Estimates of Changes in Reimbursement Per Diems

| PSRO | % of days in hospitals with 1975 data | Average volume of hospitals with 1975 data | Average volume of hospitals missing 1975 data only | Area wide "inflation" in routine services (percent) | Area wide "inflat in ancillaries (percent) |
|---|---|---|---|---|---|
| A | 0 | | | 14.1 | 14.1 |
| B | 77 | 13346 | 23879 | 17.0 | 13.7 |
| C | 65 | 15862 | 33457 | 10.0 | 23.1 |
| D | | 23042 | 59378 | 9.5 | 17.3 |
| E | 69 | 25829 | 34063 | 8.5 | -18.9 |
| F | 80 | 5029 | 7359 | 12.1 | 22.4 |
| G | 85 | 9990 | 15129 | 10.9 | 23.2 |
| H | 61 | 22553 | 43120 | 4.1 | -7.4 |
| I | 78 | 8801 | 25195 | 13.1 | 25.0 |
| J | 95 | 19524 | 4819 | 20.3 | 33.1 |
| K | 84 | 15532 | 14467 | 10.8 | -19.6 |
| L | 36 | 3406 | 13615 | 19.5 | 23.4 |
| M | 80 | 13704 | 13216 | 14.0 | 18.8 |
| N | 73 | 8181 | 11943 | 18.3 | 25.9 |
| O | 11 | 2999 | 6101 | 12.6 | 13.1 |
| P | 100 | 7143 | | 24.3 | 23.9 |
| Q | 92 | 5605 | 8838 | 10.7 | 32.9 |
| R | 26 | 21959 | 20113 | 11.0 | 8.6 |

Table 5.7

Estimates of Average Per Diem and Values of a Day Saved as a Percent of Average Per Di

| PSRO | Total Average Per Diem | Value of a Day Saved | | Percentage of Per Diem | |
|---|---|---|---|---|---|
| | | Low | High | Low Estimate | High Estimate |
| A | $ 88.50 | $ 37.17 | $ 46.19 | 42 | 52 |
| B | 145.12 | 56.60 | 70.22 | 39 | 48 |
| C | 104.65 | 45.00 | 56.20 | 43 | 54 |
| D | 116.38 | 45.39 | 59.99 | 39 | 52 |
| E | 106.23 | 44.62 | 54.07 | 42 | 51 |
| F | 100.68 | 38.26 | 49.52 | 38 | 49 |
| G | 70.58 | 29.01 | 37.36 | 36 | 46 |
| H | 132.72 | 63.71 | 78.31 | 48 | 59 |
| I | 80.97 | 34.01 | 43.23 | 42 | 53 |
| J | 126.10 | 59.27 | 72.71 | 47 | 58 |
| K | 117.64 | 52.94 | 63.47 | 45 | 54 |
| L | 128.36 | 52.63 | 68.95 | 41 | 54 |
| M | 120.80 | 54.36 | 68.84 | 45 | 57 |
| N | 191.29 | 70.78 | 94.84 | 37 | 50 |
| O | 118.43 | 48.56 | 67.76 | 41 | 57 |
| P | 152.46 | 62.51 | 81.33 | 41 | 53 |
| Q | 171.52 | 58.32 | 79.49 | 34 | 46 |
| R | 159.04 | 71.57 | 88.44 | 45 | 56 |
| weighted average | $111.05 | $46.13 | $ 59.64 | 41.5 | 53.7 |

range from a low of .34 in PSRO Q to a high of .48 in PSRO H. All of these values tend to cluster around a value of .4 which is the estimate used by the Cost of Living Council as the ratio of marginal costs to total costs for hospitals.

## 5.3 The Relationship Between PSRO Expenditures and Total Medicare Expenditures

The weighted average Medicare per diem for the eighteen PSRO areas is $111.05. The weighted average per diem expense in going from UR to PSRO (i.e., PSRO incremental cost) is $1.08. This is not exactly overwhelming potential for leverage. Even if utilization control through concurrent review had a two to one benefit-cost ratio this would only yield a net reduction in expenditures of .98 percent. In fact, the benefit-cost ratio of incremental PSRO expenditures would have to exceed 16 in order merely to match the inflation in medical prices observed between 1975 and 1976.

The story is not much changed if one looks at total PSRO expenditures rather than merely the incremental ones. The average review cost per day is $1.50, or 1.33 percent of Medicare expenditures per day. Hence even if PSROs can reach "break-even" levels of utilization reduction, PSRO potential for cost containment has to be seen as negligible.

## 5.4 "Break-Even" Utilization Reductions

Given estimates of PSRO expenditures and the estimates of the value of one day reductions in utilization, it was straightforward to estimate the numbers of days that would have to be "saved" to "break-even" in each PSRO. These are presented in Table 5.8. The "low" value estimates correspond to

## Table 5.8

## Breakeven Utilization Reductions

| | Breakeven days | | Breakeven days/1000 eligibles | | % change on days/eligible | |
|---|---|---|---|---|---|---|
| SRO | Low Value* | High Value | Low Value | High Value | Low Value | High Value |
| A | 3580 | 2881 | 103.6 | 83.4 | 2.9 | 2.3 |
| B | 6056 | 4882 | 81.0 | 65.3 | 2.0 | 1.6 |
| C | 2445 | 1957 | 71.1 | 56.9 | 1.7 | 1.3 |
| D | 6223 | 4709 | 41.8 | 31.6 | 1.0 | .8 |
| E | 4038 | 3332 | 79.9 | 65.9 | 2.2 | 1.8 |
| F | 12941 | 9998 | 168.1 | 129.8 | 4.9 | 3.8 |
| G | 20828 | 16173 | 82.3 | 63.9 | 1.9 | 1.5 |
| H | 17[illegible] | 1408 | 45.9 | 37.3 | 1.6 | 1.3 |
| I | 14932 | 11787 | 63.9 | 50.3 | 2.1 | 1.6 |
| J | 1807 | 1473 | 41.4 | 33.8 | .9 | .7 |
| K | 1618 | 1316 | 48.1 | 39.1 | 1.7 | 1.4 |
| L | 8450 | 6450 | 90.3 | 68.9 | 3.3 | 2.5 |
| M | 6695 | 5287 | 73.7 | 58.2 | 2.0 | 1.6 |
| N | 2060 | 1537 | 47.3 | 35.3 | 1.9 | 1.4 |
| O | 6815 | 4884 | 73.2 | 52.4 | 3.1 | 2.2 |
| P | 2476 | 1903 | 58.5 | 45.0 | 2.7 | 2.1 |
| Q | 2099 | 1536 | 35.8 | 26.2 | 1.8 | 1.3 |
| R | 6538 | 5291 | 67.2 | 54.4 | 1.5 | 1.2 |
| Weighted average | 6187.6 | 4822.4 | 72.7 | 56.7 | 2.05 | 1.60 |

*for day saved

the lower value of a day saved, "high" value estimates were generated using a higher value per day saved.

Using the low values, "break-even" reductions range from 1618 days in PSRO K to a high of 20,828 days in PSRO G. The former is a substate area of rural counties, the latter is a rural state. Using the higher value for a day saved produced "break-even" estimates which were lower by about 20 to 25 percent.

When standardized per 1000 eligibles the variations in "break-even" reductio shifted. The high value estimates ranged from 26.2 days per 1000 eligibles in PSRO Q to 129.8 days per eligible in PSRO F. Again, these are both rural areas. Q is a substate area, F is a entire state.

When compared to projected utilization rates for the areas, those "break-even" utilization reductions appear quite small. Even when using a low value per day saved, area O could "break-even" if it reduced utilization per 1000 by 0.9 percent. The (weighted) average "break-even" reduction using the low value estimate was only 2.05 percent and the maximum needed was only 4.9 percent, in PSRO area F. With the high value estimates, the average "break-even" reduction required is only 1.60 percent.

At first glance these figures may appear inconsistent with the discussion of the relation between Medicare expenditures and incremental PSRO review costs. However, since the value of a day saved is roughly 40 percent of the average daily per diem, a one percent reduction in expenditures would require a utilization reduction more than twice that size. Hence, even with respect to the high value estimates, complete cost containment would require an

average utilization reduction of 22.6 percent. This is approximately the same as eliminating, on the average, one hospital stay out of four.

### 5.5 Estimate Utilization Reductions

The study detailed in Volume 3 provided a method for assessing the actual level of utilization reductions in the PSRO areas. Estimates were provided for each of the eighteen PSRO areas of the utilization that should have been observed if those PSROs were only as effective as the alternative program, utilization review. (Correspondingly, our stress has been on the incremental cost of PSRO compared to UR.)

These estimates are compared to observed utilization levels in Table 5.9. Of the eighteen PSRO areas only seven had observed levels below the projected levels. These varied from a high of 15 percent reduction in PSRO A to a low of 2.8 percent reduction in PSRO G. The smallest increase in utilization was 1 percent in area H. PSRO R had a utilization increase of 10.6 percent.

Of the seven PSROs with reductions, all but one comfortably exceeded the "break-even" levels. Only PSRO F reduced utilization by less than its "break-even" level. PSRO F, however, did have the highest "break-even" levels of all the eighteen PSROs.

The estimated reductions in those seven areas were sufficiently large enough to produce an aggregate reduction in utilization per 1000 eligibles of 25 days. This amounted to a decline of 0.6 percent, but was below that of the aggregate "break-even" levels of 1.6 and 2.05 percent (see Table 5.8). However, although six of these seven PSROs had estimated benefit-cost ratios in

Table 5.9

Utilization Rates

|  |  |  |  | % Required to "Break-even" Differences |  |
|---|---|---|---|---|---|
| 0 | Projected utilization rate/1000 eligibles | Observed utilization rate/1000 eligibles | % difference in rates | Low* value | High* value |
|  | 3551.9 | 3017.9 | -15.0 | -2.9 | -2.3 |
| + | 4002.9 | 3515.6 | -12.1 | -2.0 | -1.6 |
| + | 4259.4 | 3805.3 | -10.6 | -1.7 | -1.3 |
|  | 4171.2 | 3975.6 | -4.6 | -1.0 | -.8 |
|  | 3611.5 | 3472.1 | -3.8 | -2.2 | -1.8 |
|  | 3460.3 | 3334.1 | -3.6 | -4.9 | -3.8 |
| + | 4339.3 | 4214.6 | -2.8 | -1.9 | -1.5 |
| + | 2972.2 | 2999.9 | +1.0 | -1.6 | -1.3 |
|  | 3096.1 | 3140.6 | +1.4 | -2.1 | -1.6 |
|  | 4729.6 | 4807.3 | +1.6 | -.9 | -.7 |
| + | 2836.9 | 2893.2 | +1.9 | -1.7 | -1.4 |
| + | 2743.3 | 2812.2 | +2.5 | -3.3 | -2.5 |
|  | 3613.8 | 3785.6 | +2.5 | -2.0 | -1.6 |
|  | 2452.4 | 2531.8 | +3.2 | -1.9 | -1.4 |
| + | 2354.7 | 2459.6 | +4.4 | -3.1 | -2.2 |
| + | 2145.6 | 2249.7 | +4.8 | -2.7 | -2.1 |
|  | 1951.7 | 2113.4 | +8.2 | -1.8 | -1.3 |
| + | 4618.1 | 5108.3 | +10.6 | -1.5 | -1.2 |
| weighted average | 3527.4 | 3507.1 | -0.6 | -2.05 | -1.60 |

*for a day saved

+PSRO with prior review experience

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